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Yuuzou Kurokami

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05/04/2005

SUGHRUE, MION, ZINN, MACPEAK & SEAS  
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EXAMINER

TORRES, JUAN A

ART UNIT

PAPER NUMBER

2631

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/988,374

Applicant(s)

KUROKAMI, YUUZOU

Examiner

Juan A. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-16 is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-11 is/are rejected.
- 7) ☒ Claim(s) 6 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01-10-2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 112***

In view of the amendment filed on 01/10/2005, the Examiner withdraws the 35 USC § 112 rejections of the previous Office Action.

### ***Response to Arguments***

Applicant's arguments filed on 01/10/2005 have been fully considered but they are not persuasive.

The Applicant contends, "Here, regarding the Aono reference, in the grounds of rejection with respect to independent claims 1 and 7, the Examiner relies on independent structures from two entirely different embodiments that are each arranged differently than each other and that are each arranged differently than the arrangement of elements as claimed. Specifically, in rejecting claim 1, the Examiner separately relies on FIGs. 3 and 8 for teaching different respective elements".

The Examiner disagrees and asserts, that Aono only use one embodiment; the use of FIG. 3 and 8 is for elegance and clarity of the presentation; and the same rejection can be done using only FIG. 8.

The Applicant contends, "Thus, even assuming, arguendo, that the figures relied on by the Examiner in Aono teach all of the claimed elements in isolation, which they do not as discussed further below, Aono does not, and can not, anticipate either of claims 1 or 7 because the two different embodiments illustrated in FIGs. 3 and 8 are each

arranged differently from the arrangement of recited claim elements. For at least this reason, the anticipation of claims 1, 2, 7 and 8 is improper and should be withdrawn "

The Examiner disagrees and asserts that Aono only use one embodiment, this is very clear reading all the disclosure of Aono; the use of FIG. 3 and 8 is for elegance and clarity of the presentation; and the same rejection can be done using only FIG. 8.

The Applicant contends, "Furthermore, Aono does not teach each and every element of claims 1, 2, 7 and 8. For example, claim 1 recites, "first and second phase controllers associated with said first and second demodulators, respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal." Applicant submits that Aono does not teach this recited element. "

The Examiner disagrees and assert, one of ordinary skill in the art will clearly anticipates that block 31 input of block 44 and block 43 and 45 and the described in detail in FIG. 4 including the disclosure of Aono anticipates each and every element.

The Applicant contends, "In particular, the Examiner asserts that FIG. 3 teaches the claimed phase controllers as items 43-45 and 53-55. In FIG. 3 of Aono, however, there is no disclosure that would lead one of ordinary skill in the art to believe that the elements cited by the Examiner function the same as the recited elements of the claim. For instance, there is no basis whatsoever for the conclusion that any of items 43-45 or 53-55 in FIG. 3, alone or in combination, equalize the phases of a base-band signal and a cross polarization interference cancel reference signal".

The Examiner disagrees and asserts, that one of ordinary skill in the art will clearly anticipate the elements cited by the claim.

The Applicant contends "In regard to claim 13, Applicant submits that Iwamatsu fails to teach or suggest at least the operations of "detecting a phase-difference between said IF signals and transmitting a phase-difference signal indicative of the thus detected phase-difference" and "equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal. The Examiner asserts on page 7 of the office action that Iwamatsu teaches the above-cited operations in FIG. 15, at-blocks 103a and 103b, and FIG. 16, block 117, respectively. It is respectfully noted, however, that nowhere in FIGs. 15 and 16, or within their respective attendant descriptions in the specification, is it disclosed that the phase difference between the respective intermediate frequency (IF) signals is determined and then used to equalize the phases of the base-band signal and the cross polarization interference cancel (XPIC) reference signal, as claimed. Iwamatsu, in comparison, discloses, at FIGs. 15 and 16, a system where digital In-phase (I) and Quadrature (Q) versions of the IF signal are input to a transversal equalizer (TVEQ) where the I and Q versions of the IF signal are subjected to waveform equalization processing to eliminate transmission path distortion and quadrature distortion. (Col. 2, lines 24-27). Iwamatsu does not anywhere disclose calculating the phase difference between the IF signals of two differently polarized received signals and using the phase difference between these two IF signals to equalize the phases of the base-band and XPIC signals "

The Examiner agrees and withdrawn his rejection of claims 13 and 14.

All amendment and arguments by the applicant have been considered. It is Examiner's conclusion that claims 1-5 and 7-11 are not patentably distinct or not-obvious over the prior art of record in view of the references, Aono et al. (JP401291540A) and Iwamatsu (US 6236263). As applied in the last office action, filed 10/19/2004. Therefore, the rejection is maintained.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –  
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Aono (JP401291540A).

As per claim 1 Aono discloses a cross polarization interference canceller comprising: (a) first and second signal receivers which receive signals having been transmitted through first and second polarizations vertical with each other (figure 8 blocks 42 and 52); (b) first and second local oscillators each of which converts one of said signals into an IF signal (figure 8  $f_{R1}$  and  $f_{R2}$ ); (c) first and second demodulators each of which demodulates said IF signal for producing a base-band signal and a cross polarization interference cancel reference signal (figure 8 blocks 11 and 21); (d) a phase-difference detector which detects a phase-difference between local signals transmitted from said first and second local oscillators, and transmits a phase-difference

signal indicative of the thus detected phase-difference (figure 8 blocks 63' and 64'); and (e) first and second phase controllers associated with said first and second demodulators, respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal (figure 8 blocks 65-72, 70 is the control unit).

As per clam 2 and 8 Aono discloses a phase-difference detector transmits two phase-difference signals in which directions in which phases are deviated are opposite to each other, and wherein said first and second phase controllers receive said two phase-difference signals transmitted from said phase-difference detector, and transmit signals to said first and second demodulators, respectively, in which signals phase-shifting directions are opposite to each other (figure 4 block 31).

As per clam 7 Aono discloses a cross polarization interference canceller comprising: (a) first and second signal receivers which receive signals having been transmitted through first and second polarizations vertical with each other (figure 3 blocks 41 and 51); (b) first and second local oscillators each of which converts one of said signals into an IF signal (figure 8  $f_{R1}$  and  $f_{R2}$ ); (c) first and second demodulators each of which demodulates said IF signal for producing a base-band signal and a cross polarization interference cancel reference signal (figure 3 DT1 and S13); (d) a phase-difference detector which detects a phase-difference between local signals transmitted from said first and second local oscillators, and transmits a phase-difference signal indicative of the thus detected phase-difference (figure 8 blocks 63' and 64'); first and second phase controllers associated with said first and second demodulators,

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respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal (figure 8 blocks 43-45 and 53-55): and ; and a reference oscillator electrically connected to both said first and second local oscillators for synchronizing said first and second local oscillators with each other (figure 3  $f_R$ ).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-5 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aono (JP401291540A) as applied to claims 2 and 8 above, and further in view of Iwamatsu (US 6236263).

As per claims 3 and 9 Aono discloses claims 2 and 8. Aono doesn't disclose that the phase controller is comprised of a variable phase-shifter. Iwamatsu discloses a phase controller is comprised of a variable phase-shifter (figure 10 block 40). Aono and Iwamatsu are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the phase-shifter disclosed by Iwamatsu with the phase controller disclosed by Aono. The suggestion/motivation for doing so would have been to control the phase of the signal and to reduce the complexity of the local oscillator (Iwamatsu



abstract and column 9 lines 55-58). Therefore, it would have been obvious to combine Aono and Iwamatsu to obtain the invention as specified in claims 3 and 9.

As per claims 4 and 10 Aono discloses claim 1 that includes (a) to (e). Aono doesn't disclose the detail composition of the demodulator. Iwamatsu (co-inventor of JP401291540A) discloses the details of the demodulator, including (c1) a carrier oscillator which converts frequencies of both IF signals transmitted through said first and second polarizations (figure 10 block 12); (c2) first and second analog-digital converters which convert said IF signals into first and second digital signals for said first and second polarizations, respectively (figure 10 block 13); (c3) a numerical controlled oscillator which transmits a carrier signal (figure 10 block 15); (c4) a first endless phase-shifter which receives both said first digital signal and said carrier signal, and demodulates said base band signal (figure 10 block 19 and 20); (c5) a second endless phase-shifter which receives both said second digital signal and said carrier signal, and demodulates said cross polarization interference cancel reference signal (figure 10 block 21' and 22'); (c6) a filter which receives said cross polarization interference cancel reference signal, and produces a first signal indicative of interference caused by said second polarization (figure 10 block 24); (c7) an adder which adds said base band signal and said first signal to each other to thereby remove cross polarization interference (figure 10 block 25 and 26); (c8) a judgment circuit which receives an output signal transmitted from said adder, and transmits an error signal (figure 10 block 27); (c9) a carrier synchronization controller which controls a frequency of said carrier signal in accordance with said error signal (figure 10 block 27a); and (c10) a tap coefficient

controller which controls a tap coefficient of said filter in accordance with said error signal (figure 10 block 41). Aono and Iwamatsu are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the phase-shifter disclosed by Iwamatsu with the phase controller disclosed by Aono. The suggestion/motivation for doing so would have been to control the phase of the signal and to reduce the complexity of the local oscillator (Iwamatsu abstract and column 9 lines 55-58). Therefore, it would have been obvious to combine Aono and Iwamatsu to obtain the invention as specified in claims 4 and 10.

As per claims 5 and 11 Aono and Iwamatsu disclose claims 4 and 10. Iwamatsu also discloses that the first and second phase controllers are comprised of a variable phase-shifter (figure 10 block 27) electrically connected to said second endless phase-shifter (figure 10 block 41). Aono and Iwamatsu are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the phase-shifter disclosed by Iwamatsu with the phase controller disclosed by Aono. The suggestion/motivation for doing so would have been to control the phase of the signal and to reduce the complexity of the local oscillator (Iwamatsu abstract and column 9 lines 55-58). Therefore, it would have been obvious to combine Aono and Iwamatsu to obtain the invention as specified in claims 5 and 11.

***Allowable Subject Matter***

Claims 13-16 are allowable over prior art.

The following is an examiner's statement of reasons for allowance: claims 13-16 are allowed because the references cited fail to teach, as applicant has, the steps of detecting a phase-difference between said IF signals and transmitting a phase-difference signal indicative of the thus detected phase-difference; and equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal, as the applicant has claimed.

Claims 6 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on M-F 9:00 AM- 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Juan Alberto Torres, Ph. D.  
04-07-2005

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